Amended Second Assessment of Child Dental Health Status

As required by *Frew v. Janek*

Prepared by:
Texas Department of State Health Services
Division of Family and Community Health
Office of Program Decision Support
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EXHIBIT 9

Contents

Introduction

The *Frew, et al. v. Janek, et al.* Corrective Action Order: Health Outcomes Measures and Dental Assessment (CAO) requires that the Defendants conduct a valid dental study that assesses dental health of children with Medicaid, implement a corrective action plan following the study, and conduct a second dental study. This report presents results of the second study required by the CAO and highlights additional analyses in response to Plaintiff's memo to the Texas Office of Attorney General dated May 19, 2014.

The key findings from the first study indicated that third grade children enrolled in Medicaid experienced lower rates of untreated dental decay and higher rates of receiving sealants compared to third grade children not enrolled in Medicaid. Among Head Start children, it was found that children enrolled in Medicaid experienced lower rates of untreated dental decay, as compared with non-Medicaid children. Head Start children enrolled in Medicaid also had higher rates of dental care utilization than non-Medicaid children, as measured by greater prevalence of having ever seen a dentist, having seen a dentist within the past year, and having a family dentist.

Methodology

Basic Screening Survey

The oral health status of children enrolled in Medicaid was assessed by using the Basic Screening Survey (BSS) developed by the Association of State and Territorial Dental Directors (ASTDD) in collaboration with the Centers for Disease Control and Prevention's (CDC) Division of Oral Health. ASTDD developed the BSS in 1999, in response to the need for community-level oral health data.

The BSS consists of two parts: 1) questions about the oral health history of the person being screened, and 2) direct screening of individuals for caries and sealants. The measures used in the BSS are reported to the National Oral Health Surveillance System (NOHSS), which allows comparison with other states and with the nation at a level consistent with monitoring the national health objectives found in the United States Public Health Service's Healthy People 2020 document.

BSS collects demographic information about the child being screened via a parent-completed questionnaire, which also serves as the consent form (see Appendix A for English versions of the third grade and Head Start Parent Permission Form (PPF)). BSS questions ask about basic socio-demographic data for each child, including:

- Age (years)
- Sex (male/female)
- Race/Ethnicity (White, Black, Hispanic, Other)
- Medicaid enrollment status (yes/no)
- Enrollment in Free/Reduced Lunch Program (yes/no) [3rd grade only]

The questionnaire also asks about other information that is pertinent to this report, such as:

- if the family has a family dentist (yes/no and name of dentist);
- whether the child has ever seen a dentist (yes/no); and
- whether the child has seen a dentist in the past year (yes/no)

The second part of the BSS consists of a direct Limited Oral Health Evaluation (LOE) of the child's mouth by qualified dentists. Before conducting an assessment, the dental teams underwent calibration training conducted by Dr. Kathy Phipps, the Data and Surveillance Coordinator for the Association of State and Territorial Dental Directors. This training insured that all dentists were reliably following the definitions and diagnosis criteria in the BSS. Results from the calibration training are presented in Appendix B.

Table 1 presents the outcomes that were measured during the LOE.

Table 1: Description of the Dental Health Outcome Measures Collected During the Limited Oral Health Evaluation

Indicator	Description
1. Past Treatment	The presence of any type of filling, crown, or a tooth that is missing because it was extracted as the result of decay
2. Untreated caries	Screener can readily observe a break-down of the enamel surface
3. Urgent dental care needed	Need for care within 24-48 hours because of signs or symptoms that include pain, infection, or swelling
4. Early dental care needed	Child has untreated decay, but child does not have pain or an infection
5. Sealant Prevalence	Child has at least one fully or partially retained dental sealant on a primary and/or permanent molar (3rd grade only)

Current or past caries was also measured as the number of children that either had past treatment for caries or had untreated caries. If a child was found to have urgent dental care needs, the team reported this back to parents and encouraged appropriate oral health follow-up. Those with no obvious signs for treatment need were encouraged to continue seeking regular dental care within their dental home.

For the Head Start population, whether the child would require dental therapy under general anesthesia was measured with an algorithm using the following data elements:

- child's age;
- level of untreated decay (measured by the number of sextants with untreated decay);
- child's response to the examination process; and
- the presence of a co-morbid condition or special health care need, as reported by the parent, that may potentially require general anesthesia in order to provide needed dental care.

Children were included in the category of "requiring dental care that may potentially include either inpatient hospitalization or outpatient treatment under general anesthesia" based on scores derived with the 22-point "Criteria for Dental Therapy Under General Anesthesia" metric from the *2013 Texas Medicaid Provider Procedures Manual* (Appendix D).

Study Population

In an effort to assess the dental health status of children enrolled in Medicaid, the Texas Department of State Health Services (DSHS) Oral Health Program (OHP) administered the BSS among two separate populations: (1) public elementary school children in the third grade, 8 to 10 years of age, and (2) preschool children, 3 through 5 years of age, newly enrolled in Head Start. The methods and results for the third grade BSS are presented first, followed by the methods and results for the Head Start BSS.

Study Design – Third Grade BSS

The school year (SY) 2012-2013 third grade sample consisted of 6,351 students that fully participated in the BSS. Data from this sample of children were weighted to be representative of all third graders enrolled in Texas public schools. The study had a target sample size of 4,400 students, which was determined to be an adequate sample size to reliably estimate dental health status with a 95 percent confidence interval (CI) of ± 3 percentage points for the Medicaid and non-Medicaid classes. With over 6,000 students in the sample, there is an adequate sample size to estimate oral health status among the Medicaid and non-Medicaid students across the state.

The sampling strategy utilized probability proportional to size (PPS) to sample public school children in third grade. PPS is a multi-stage sampling technique in which sites are first selected where their probability of being selected is proportional to their size. Once sites are selected, individuals are selected within the site. This design is very effective when sites vary in population and the goal is to sample the majority of individuals in each site. This sampling strategy also minimizes differences in the probability that an *individual* will be selected, thus ensuring selection of a representative sample of the target population, while maximizing logistical efficiency. To be geographically representative and ensure statewide coverage, the sample was drawn from four strata that represented urban-border, rural-border, urban-non-border, and rural-non-border regions of the state.

The sampling frame for the third grade BSS consisted of a list of public elementary schools, provided by the Texas Education Agency (TEA) for SY 2010-2011. Using the TEA geographic designation of the school, 35 schools were selected from each stratum using PPS. Additionally, schools within each stratum were sorted by the percent of children eligible for free/reduced lunch programs. A systematic PPS selection of schools through this sorted list ensured proportional representation by free/reduced lunch eligibility. At each school, an attempt was made to include all eligible children in the BSS.

All third grade students enrolled at a participating school were screened if the child:

- had parental consent;
- was willing to participate; and
- was present on the day of the LOE.

Table 2 represents a description of the third grade BSS population, sample selection parameters, and actual sample data obtained from the 2012-2013 study. Two of the 140 selected schools declined to participate; however, this did not impact the required sample size to reliably estimate dental health status of third graders with Medicaid.

Sample weights, both unadjusted and adjusted for the nonresponse rates, were calculated from the original PPS sampling using the formulae described in Appendix C. The weights used in all analyses presented in this report were adjusted for nonresponse rate.

Table 2: Description of Third Grade BSS, SY2012-2013

	Strata				
	Non-Border		Border		
	Rural	Urban	Rural	Urban	Texas
Population data					
Number of third grade students	33,230	281,116	4,870	21,982	341,198
Stratum-specific proportion of students	10%	82%	1%	7%	100%
Number of third grade schools	480	2,918	66	233	3,697
Sample Selection Parameters					
Number of third grade students	4,043	3,671	3,377	3,498	14,589
Stratum-specific proportion of students	28%	25%	23%	24%	100%
Number of third grade schools	35	35	35	35	140
Minimum # for valid sample	1,100	1,100	1,100	1,100	4,400
Sample data					
Sample size (# of third grade students)	1,539	1,338	1,777	1,697	6,351
Stratum-specific proportion of students	24%	21%	28%	27%	100%
Number of third grade schools	35	34	35	34	138
Average Response Rate *	41%	37%	56%	52%	45%

Number of students/schools includes instructional public schools with free-reduce lunch and ≥5 third grade students
* Definition of Average Response Rate comes from: (1) American Association for Public Opinion Research, Standard Definitions, 2011, http://www.aapor.org/AM/Template.cfm?Section=Standard_Definitions2&Template=/CM/ContentDisplay.cfm&ContentID=3156.

Imputation Methods for Missing Data

Following well-established guidelines, before conducting the analyses, missing data were analyzed and, when appropriate, imputed [3]. It is well established that the validity of conclusions drawn from incomplete data may be questionable and limit generalizability of the results [7, 8]. In the third grade sample, more than 8 percent of the data for the Medicaid variable were missing. Analyses of the missing patterns showed that the data were missing at random in the White sample and in the non-White sample. In order to address the "missingness" in this variable, multiple imputation (MI) using a Markov Chain Monte Carlo method was used to estimate Medicaid status for children with missing values (see Appendix C for an extensive discussion of this procedure).

Third Grade Results

Third Grade BSS demographics

There were 6,351 third grade children, ages 6 through 12 years, surveyed during SY 2012-2013. Of these children, 99.6 percent were between 8 and 10 years of age. An additional 392 children (89 Medicaid, 114 non-Medicaid, 189 missing Medicaid status) had permission to participate, but were absent on the day of the assessment or had moved before the assessment was begun. These children were excluded from all analyses. Table 3 presents the estimated demographic characteristics of third grade children in Texas by Medicaid status. In general, based on overlapping confidence intervals, there do not appear to be any significant differences between the Medicaid and non-Medicaid sub-populations with regard to demographic characteristics (see Appendix C for discussion on interpreting confidence intervals). The only exception to this is that Whites were a smaller percentage of the Medicaid group than the non-Medicaid group (16.2 versus 31.2 percent, respectively).

Table 3: Demographic Characteristics of Third Grade Sample, Weighted and Adjusted for Non-Response

	Medicaid (Parent Report)			Non-Medicaid (Parent Report)		
Demographic Characteristics	**Respondents (N=2,498)**	**Prevalence (%)**	**95% Confidence Intervals**	**Respondents (N=3,853)**	**Prevalence (%)**	**95% Confidence Intervals**
Mean age (years)	2,476	8.6	--	3,832	8.4	--
Sex						
Male	1,115	45.0	41.7 - 48.3	1,724	44.8	41.5 - 48.2
Female	1,239	49.8	45.7 - 53.9	2,013	52.5	49.1 - 55.9
Unknown/Missing	144	5.2	2.7 - 7.7	116	2.7	1.7 - 3.7
Race/Ethnicity						
White	340	18.0	12.1 - 24.0	957	34.4	25.6 - 43.1
Black	127	15.5	5.1 - 25.8	159	7.4	4.3 - 10.7
Hispanic	1,792	55.7	45.0 - 66.5	2,380	45.0	36.8 - 53.2
Other	46	4.3	1.7 - 6.8	142	8.2	2.5 - 14.0
Unknown/Missing	193	6.5	4.2 - 8.8	215	4.9	3.5 - 6.4

Results of the 3rd grade LOE

Table 4 (page 8) presents the prevalence estimates of selected oral health outcomes as well as the prevalence of sealants among third grade school children in Texas by Medicaid status. There were significant differences between the Medicaid and non-Medicaid groups with regard to four of the listed dental outcomes including history of current or past caries, past treatments, untreated dental decay, and sealant prevalence. Children not enrolled in Medicaid had a lower prevalence of experience with caries. Children enrolled in Medicaid had a significantly higher prevalence for having evidence of past treatment for caries than children not enrolled. Additionally, they had a significantly lower prevalence of untreated dental caries. Children enrolled in Medicaid also had a significantly higher prevalence of having dental sealants on their molars. While the Medicaid children had higher prevalence of experience with caries, they had a higher prevalence of these caries being treated than non-Medicaid children.

Table 4: Prevalence of Selected Dental Health Outcomes among Third Grade School Children in Texas by Parent-Reported Medicaid Status, 2012-2013, Weighed and Adjusted for Non-Response

	Medicaid (Parent Report)				
			95% Confidence Intervals		
Dental Health Outcomes	Prevalence (%)	Standard Error	Lower	Upper	Respondents (N=2,498)
Current or past caries	76.5	3.1	70.3	82.7	1,956
Past treatment	70.6	3.7	63.4	77.9	1,799
Untreated dental caries	20.1	2.1	16.0	24.1	522
Urgent dental care needed	2.7	1.0	0.7	4.6	43
Sealant prevalence	61.5	3.1	55.5	67.6	1,502
	Non-Medicaid (Parent Report)				
			95% Confidence Intervals		
Dental Health Outcomes	Prevalence (%)	Standard Error	Lower	Upper	Respondents (N=3,853)
Current or past caries	61.9	2.5	57.0	66.8	2,527
Past treatment	48.7	2.1	44.5	52.9	1,962
Untreated dental caries	28.8	1.9	25.0	32.7	1,231
Urgent dental care needed	5.5	1.0	3.5	7.4	142
Sealant prevalence	45.6	2.4	40.9	50.4	1,583

Results of the 3rd Grade Parent Report

Table 5 presents prevalence estimates for access and utilization of dental care among third grade school children in Texas by Medicaid status. Parents of third grade children reported to be on Medicaid had a significantly higher prevalence of reporting that they had a family dentist and also a significantly higher prevalence of having seen a dentist within the past year. It must be noted that there was a substantial amount of missing data (1,152 records) for the family dentist question. This "missingness" was taken into consideration in the analysis, and the prevalence estimates represent those that had a dentist from the categories: missing, no family dentist, and family dentist.

Table 5: Prevalence of Dental Care Access and Utilization among Third Grade School Children in Texas by Parent-Reported Medicaid Status, 2012-2013, Weighed and Adjusted for Non-Response

	Medicaid (Parent Report)				
			95% Confidence Intervals		
Dental Care	Prevalence (%)	Standard Error	Lower	Upper	Respondents (N=2,498)
Ever seen a dentist	94.8	1.1	92.6	97.0	2,396
Seen a dentist within past year	82.5	1.3	80.0	85.0	1,911
Have a family dentist	54.6	2.6	49.5	59.8	1,514
	Non-Medicaid (Parent Report)				
			95% Confidence Intervals		
Dental Care	Prevalence (%)	Standard Error	Lower	Upper	Respondents (N=3,853)
Ever seen a dentist	90.7	1.1	88.5	93.0	3,435
Seen a dentist within past year	70.8	2.0	66.8	74.8	2,352
Have a family dentist	45.4	3.0	39.4	51.4	1,778

Results of Medicaid Enrollment via Medicaid Matched Data

The third grade BSS data were matched to the 2012-2013 Medicaid enrollment files. This matching allowed us to verify Medicaid enrollment and to identify how long the child was enrolled in Medicaid.

Of the 2,498 children whose parents indicated that the child was enrolled in Medicaid or for whom we imputed Medicaid status, 1,548 were found to have been enrolled for 12 months or more and 823 were found to have been enrolled for fewer than 12 months. There were 592 children in this group whose enrollment could not be verified. Of the 3,853 children who were identified as *not* enrolled in Medicaid by the parent or through imputation, 464 of these children were matched to the Medicaid eligibility file. The majority (373) of these children had been enrolled in Medicaid for less than one year. For the purposes of this report, all children who were not matched to a Medicaid eligibility file were identified as being a "non-Medicaid" child.

The results of the verified Medicaid enrollment data followed the same patterns seen using the parent-reported Medicaid data (see Table 6). Children enrolled in Medicaid for any length of time had a significantly higher prevalence experience with caries, but also a higher prevalence for evidence of past treatment for caries than non-Medicaid children. Finally, children enrolled in Medicaid for more than 12 months had a significantly higher prevalence of having evidence for sealants on their teeth than non-Medicaid children and children enrolled in Medicaid for fewer than 12 months.

Table 6: Prevalence of Selected Dental Health Outcomes among Third Grade School Children in Texas by Verified Medicaid Status, 2012-2013, Weighed and Adjusted for Non-Response

	Medicaid 12 Months or Longer (Matched Data)				
			95% Confidence Intervals		
Dental Health Outcomes	**Prevalence (%)**	**Standard Error**	**Lower**	**Upper**	**Respondents (N=1,548)**
Current or past caries	77.2	3.0	71.3	83.2	1,221
Past Treatment	71.5	3.9	63.8	79.3	1,133
Untreated dental caries	20.2	2.9	14.5	25.8	316
Urgent dental care needed	3.4	1.3	0.8	6.0	30
Sealant Prevalence	64.7	3.5	57.7	71.7	963
	Medicaid less than 12 Months (Matched Data)				
			95% Confidence Intervals		
Dental Health Outcomes	**Prevalence (%)**	**Standard Error**	**Lower**	**Upper**	**Respondents (N=823)**
Current or past caries	78.3	5.8	66.9	89.9	623
Past Treatment	69.3	5.5	58.3	80.2	551
Untreated dental caries	26.0	4.0	18.1	33.8	205
Urgent dental care needed	3.4	1.5	0.4	6.4	26
Sealant Prevalence	49.4	4.0	41.5	57.4	422
	Non-Medicaid (Matched Data)				
			95% Confidence Intervals		
Dental Health Outcomes	**Prevalence (%)**	**Standard Error**	**Lower**	**Upper**	**Respondents (N=3,980)**
Current or past caries	62.0	2.6	56.9	67.1	2,639
Past Treatment	49.7	2.3	45.1	54.3	2,077
Untreated dental caries	27.3	1.8	23.8	30.9	1,232
Urgent dental care needed	5.0	0.9	3.1	6.9	129
Sealant Prevalence	47.6	2.8	42.0	53.2	1,700

Table 7 presents the prevalence estimates for access and utilization of dental care based on the verified Medicaid enrollment data. As with the parent report, children who were enrolled in Medicaid for more than 12 months had a significantly higher prevalence than non-Medicaid children of having ever seen a dentist and having seen a dentist in the past year. They also had a significantly higher prevalence of having a family dentist.

Table 7: Prevalence of Dental Care Access and Utilization among Third Grade School Children in Texas by Verified Medicaid Status, 2012-2013, Weighed and Adjusted for Non-Response

	Medicaid 12 Months or Longer (Matched Data)				
			95% Confidence Intervals		
Dental Care	**Prevalence (%)**	**Standard Error**	**Lower**	**Upper**	**Respondents (N=1,548)**
Ever seen a dentist	96.6	1.1	94.4	98.8	1,497
Seen a dentist within past year	87.2	1.8	83.6	90.7	1,244
Have a family dentist	61.0	3.6	53.8	68.2	1,008
	Medicaid less than 12 Months (Matched Data)				
			95% Confidence Intervals		
Dental Care	**Prevalence (%)**	**Standard Error**	**Lower**	**Upper**	**Respondents (N=823)**
Ever seen a dentist	94.1	1.9	90.4	97.9	771
Seen a dentist within past year	68.1	3.6	61.0	75.3	553
Have a family dentist	42.8	4.9	33.2	52.5	398
	Non-Medicaid (Matched Data)				
			95% Confidence Intervals		
Dental Care	**Prevalence (%)**	**Standard Error**	**Lower**	**Upper**	**Respondents (N=3,980)**
Ever seen a dentist	90.5	1.2	88.2	92.9	3,563
Seen a dentist within past year	72.4	1.9	68.5	76.2	2,466
Have a family dentist	46.2	2.8	40.6	51.9	1,886

Results Comparison of the First and Second Assessments of Third Grade

Data from the first and second BSS Dental Assessments were compared to investigate population-level changes in oral health. The data from the first assessment were not suitable to be matched with Medicaid eligibility file; therefore, the parent's report of Medicaid status was used to compare between the years. Additionally, one of the measures from the 2008-2009 assessment was not comparable with the 2012-2013 measurement. In the first assessment, the LOE measured whether the child had any caries, both treated and untreated. However, in the second assessment the LOE measured whether the child had evidence of past treatment. Therefore, the prevalence for past treatments is not comparable across the assessments.

The state showed improvement in several indicators of oral health for third grade children (see Table 8). Children in the Medicaid group did not show evidence for a significant decrease in the prevalence of experience with caries, whereas the non-Medicaid group did show a decrease. However, in both the Medicaid and the non-Medicaid populations, there was a significant decrease in the prevalence of untreated dental caries from the first to the second assessment. Consistent with this decrease, there was also a significant decrease in the need for urgent dental care for both groups. Both groups also had a significantly higher prevalence of sealants in the second than first assessment.

Table 8: Comparison of the 2008-2009 and 2012-2013 Prevalence Rates of Selected Dental Health Outcomes among Third Grade School Children in Texas by Medicaid Status

	2008-2009 Assessment			2012-2013 Assessment		
		95% Confidence Intervals			95% Confidence Intervals	
	Prevalence (%)	Lower	Upper	Prevalence (%)	Lower	Upper
Medicaid (Parent Report)						
Current or past caries	77.0	73.5	80.4	76.5	70.3	82.7
Past Treatment	---	---	---	70.6	63.4	77.9
Untreated dental caries	35.4	31.4	39.4	20.1	16.0	24.1
Urgent dental care needed	6.2	4.0	8.3	2.7	0.7	4.6
Sealant Prevalence	40.8	36.9	44.7	61.5	55.5	67.6
Non-Medicaid (Parent Report)						
Current or past caries	71.6	69.1	74.1	61.9	57.0	66.8
Past Treatment	---	---	---	48.7	44.5	52.9
Untreated dental caries	45.4	42.6	48.1	28.8	25.0	32.7
Urgent dental care needed	9.7	8.0	11.3	5.5	3.5	7.4
Sealant Prevalence	31.8	29.2	34.4	45.6	40.9	50.4

Study Design – Head Start BSS

Head Start is a comprehensive child development program that serves preschool age children three through five years of age. Head Start program data show that almost 80 percent of the Head Start child population is enrolled in Medicaid. The target population for the Head Start sample was newly enrolled (first year) students as outlined in the CAO. Newly enrolled is defined as enrolled in the Head Start program less than 91 days.

Similar to the study design for the third grade, probability proportional to size (PPS) was used to sample children enrolled in Head Start. Unfortunately, unlike the target population of school-aged children, for which the Texas Education Agency provided a complete list, no comparable enrollment data exist for the Head Start target population in Texas. Hence, a multi-step process was used to gather information to develop a target sampling frame. The *Head Start Program Information Report for the 2010-2011 Program Year*, which was the most current Head Start Program Directory at the time of the survey design, was used to gather information about the total Head Start enrollment for Texas and the enrollment for each grantee. A Head Start grantee is an agency that oversees and administers several Head Start centers. Using PPS, sampling of the grantees occurred within four strata, non-border urban, non-border rural, border urban, and border rural to insure statewide geographic coverage.

Grantees were selected and approached to participate. When the grantee agreed to participate, data about estimated new enrollment were provided for each center managed by the grantee. These centers were also

sampled using PPS for the grantee to determine the center or centers the team would visit. The final weights were calculated using true enrollment numbers that were provided by the center at the time the BSS was conducted. The total enrollment for all Head Start children in Texas is known, but the population of new enrollees can only be estimated (see Table 9). To estimate this population, the total enrollment for 2013 was adjusted using the percentage of new enrollees in the sites visited (see Appendix C for a full explanation).

To participate in the Head Start BSS, pre-school children were required to:

- be newly enrolled in Head Start;
- have a signed informed consent from the child's parent or legal guardian to participate;
- be willing to participate; and
- be present the day of the LOE.

Table 9. Description of Head Start BSS, 2013

	Strata				
	Border		Non-Border		
	Rural	Urban	Rural	Urban	Texas
Population data					
Number of Head Start students	1,132	10,355	5,608	36,925	54,020
Stratum-specific proportion of students	2%	19%	10%	68%	100%
Number of Head Start grantees	3	6	20	48	77
Sample Selection Parameters					
Number of Head Start students	639	1,654	1,046	1,092	4,431
Stratum-specific proportion of students	14%	37%	24%	25%	100%
Number of Head Start grantees	2	3	7	15	27
Minimum # for valid sample	550	967	896	1,037	1,046*
Sample data					
Sample size (# of Head Start students)	445	792	510	502	2,249
Stratum-specific proportion of students	20%	35%	23%	22%	100%
Number of Head Start grantees	2	3	7	15	27
Average Response Rate **	72%	59%	56%	55%	58%

*Necessary sample size to generalize to Texas

** Definition of Average Response Rate comes from: (1) American Association for Public Opinion Research, Standard Definitions, 2011, http://www.aapor.org/AM/Template.cfm?Section=Standard_Definitions2&Template=/CM/ContentDisplay.cfm&ContentID=3156.

Based on our estimate that there are approximately 54,000 newly enrolled Head Start students, a sample size of 1,046 is necessary to generalize the finding to the state. The sample of 2,249 in this report is adequate to generalize to the dental status of the newly enrolled Head Start students in Texas.

Missing Data

Missing data were analyzed for patterns. There were no patterns in the missing data that made it appear that the data were missing systematically. However, an adequate imputation model could not be developed; therefore, in all analyses with the Head Start data, "missing" was included as a category (see Appendix C for more detail).

Head Start Results

Head Start BSS demographics

There were 2,249 children who completed the LOE. Table 10 presents demographic characteristics of the children who were newly enrolled in Head Start and participated in the LOE by Medicaid status. An additional 246 children were given permission to participate but were absent on the day of the LOE, uncooperative, or had moved before the LOE was started.

Table 10: Demographic Characteristics of Children Newly Enrolled in Head Start, September 2013-December 2013, Weighted and Adjusted for Non-Response

	Medicaid (Parent Report)			Non-Medicaid (Parent Report)		
Demographic Characteristics	**Respondents (N=1,697)**	**Prevalence (%)**	**95% Confidence Intervals**	**Respondents (N=301)**	**Prevalence (%)**	**95% Confidence Intervals**
Mean age (years)	1,697	3.6	--	301	3.7	--
Sex						
Male	839	49.4	44.9 - 53.8	161	53.8	43.6 - 64.0
Female	802	47.2	43.3 - 51.2	133	44.9	34.3 - 55.6
Unknown/Missing	56	3.4	1.6 - 5.2	7	1.3	0.0 - 2.8
Race/Ethnicity						
White	89	7.3	3.1 - 11.4	29	8.2	1.8 - 14.6
Black	229	16.6	8.9 - 24.3	31	21.0	9.3 - 32.7
Hispanic	1,260	67.4	60.0 - 74.9	217	66.7	53.5 - 79.8
Other	24	1.5	0.2 - 2.8	9	0.7	0.0 - 1.4
Unknown/Missing	95	7.2	3.5 - 10.9	15	3.5	0.8 - 6.1

	Missing Medicaid (Parent Report)		
Demographic Characteristics	**Respondents (N=251)**	**Prevalence (%)**	**95% Confidence Intervals**
Mean age (years)	251	3.5	--
Sex			
Male	116	43.3	27.3 - 59.2
Female	112	47.1	31.4 - 62.9
Unknown/Missing	23	9.6	1.2 - 18.1
Race/Ethnicity			
White	11	3.4	1.0 - 5.8
Black	47	28.0	16.0 - 39.9
Hispanic	164	61.0	49.5 - 72.5
Other	4	0.3	0.0 - 0.6
Unknown/Missing	25	7.4	2.2 - 12.6

Results of the Head Start LOE

Table 11 presents the dental health status of the surveyed children newly enrolled in Head Start by Medicaid status. Newly enrolled Head Start students whose parents indicated that they were enrolled in Medicaid had a significantly higher prevalence of having evidence of past treatment for caries than non-Medicaid recipients. For all other dental outcome measures there were no significant differences in prevalence.

Table 11: Prevalence of Selected Dental Health Outcomes among Children Newly Enrolled in Head Start in Texas by Medicaid Status, September 2013-December 2013, Weighted and Adjusted for Non-Response

	Medicaid (Parent Report)				
			95% Confidence Intervals		
Dental Health Outcomes	**Prevalence (%)**	**Standard Error**	**Lower**	**Upper**	**Respondents (N=1697)**
Current or past caries	46.0	3.1	39.8	52.2	731
Past Treatment	31.3	2.7	25.8	36.7	513
Untreated dental caries	22.2	1.7	18.8	25.6	323
Urgent dental care needed	1.0	0.4	0.2	1.9	16
General Anesthesia	1.6	0.5	0.7	2.5	34
	Non-Medicaid (Parent Report)				
			95% Confidence Intervals		
Dental Health Outcomes	**Prevalence (%)**	**Standard Error**	**Lower**	**Upper**	**Respondents (N=301)**
Current or past caries	32.7	5.7	21.3	44.0	170
Past Treatment	17.4	3.3	10.8	24.0	57
Untreated dental caries	21.7	5.6	10.6	32.8	95
Urgent dental care needed	5.1	2.3	0.5	9.6	9
General Anesthesia	0.6	0.3	0.0	1.2	5
	Missing				
			95% Confidence Intervals		
Dental Health Outcomes	**Prevalence (%)**	**Standard Error**	**Lower**	**Upper**	**Respondents (N=251)**
Current or past caries	38.0	5.5	26.9	44.0	155
Past Treatment	28.0	4.9	18.3	37.8	59
Untreated dental caries	16.1	4.0	8.0	24.1	52
Urgent dental care needed	0.8	0.7	0.0	2.1	3
General Anesthesia	1.2	0.8	0	2.8	3

Results of the Head Start Parent Report of Dental Access and Utilization

Table 12 presents the parent-reported prevalence of access and utilization of dental care based on the parent's reported Medicaid status. For all categories of dental utilization and access, there were substantial amounts of missing data. These data were included in the analyses and each prevalence below represents the percent of children given a yes, no, or missing on the question. Children identified as being enrolled in Medicaid had a significantly higher prevalence of ever having seen a dentist than non-Medicaid children.

Table 12: Prevalence of Dental Care Access and Utilization among Children Newly Enrolled in Head Start in Texas by Medicaid Status, September 2013-December 2013, Weighted and Adjusted for Non-Response

	Medicaid (Parent Report)				
			95% Confidence Intervals		
Dental Care	Prevalence (%)	Standard Error	Lower	Upper	Respondents (N=1697)
Ever seen a dentist	95.2	1.0	93.1	97.3	1,599
Seen a dentist within past year	81.8	1.4	79.0	84.6	1,403
Have a family dentist	65.4	3.4	58.6	72.2	1,223
	Non-Medicaid (Parent Report)				
			95% Confidence Intervals		
Dental Care	Prevalence (%)	Standard Error	Lower	Upper	Respondents (N=301)
Ever seen a dentist	85.1	3.1	78.8	91.3	257
Seen a dentist within past year	70.9	8.2	54.6	87.3	227
Have a family dentist	51.5	4.2	43.0	59.9	165
	Missing				
			95% Confidence Intervals		
Dental Care	Prevalence (%)	Standard Error	Lower	Upper	Respondents (N=251)
Ever seen a dentist	76.8	8.9	59.0	94.6	210
Seen a dentist within past year	69.9	8.8	52.3	87.4	181
Have a family dentist	47.8	7.2	33.4	62.3	146

Head Start Result of Medicaid Enrollment via Medicaid Matched Data

The Head Start BSS data were matched to the 2012-2013 Medicaid enrollment files. This matching allowed us to verify Medicaid enrollment and to identify how long the child was enrolled in Medicaid.

Of the 1,697 children whose parent indicated that the child was enrolled in Medicaid, 1,261 were successfully matched to the Medicaid eligibility file. Of the 301 children whose parents reported they were not enrolled in Medicaid, 101 were matched to the Medicaid eligibility file. Of those with missing Medicaid information from the BSS parent report, 165 were matched to the Medicaid eligibility file. This matching resulted in 1,185 children who were enrolled for longer than 12 months, 342 who were enrolled for fewer than 12 months and 722 children who were not matched to the Medicaid eligibility file. For the purpose of this report, these unmatched children are identified as "non-Medicaid."

The differences in prevalence on the dental outcome measures were not significant between any of the measures (Table 13). For all groups, about a third of them had evidence for past treatment. About a fifth of children newly enrolled in Head Start had untreated dental caries.

Table 13: Prevalence of Dental Outcome Measures among Children Newly Enrolled in Head Start in Texas by Verified Medicaid Status, September 2013-December 2013, Weighted and Adjusted for Non-Response

	Medicaid 12 Months or Longer (Matched Data)				
			95% Confidence Intervals		
Dental Health Outcomes	**Prevalence (%)**	**Standard Error**	**Lower**	**Upper**	**Respondents (N=1,185)**
Current or past caries	48.3	4.2	39.8	56.7	509
Past Treatment	32.8	2.9	27.0	38.7	361
Untreated dental caries	22.8	2.3	18.2	27.3	224
Urgent dental care needed	1.0	0.4	0.1	1.8	10
General Anesthesia	1.6	0.6	0.5	2.8	23
	Medicaid 12 Months or Shorter (Matched Data)				
			95% Confidence Intervals		
Dental Health Outcomes	**Prevalence (%)**	**Standard Error**	**Lower**	**Upper**	**Respondents (N=324)**
Current or past caries	45.4	3.1	39.1	51.7	140
Past Treatment	30.5	3.8	22.8	38.1	76
Untreated dental caries	21.5	5.1	11.2	31.7	85
Urgent dental care needed	1.1	0.7	0.0	2.6	4
General Anesthesia	0.3	0.2	0.0	.0.6	4
	Non- Medicaid (Matched Data)				
			95% Confidence Intervals		
Dental Health Outcomes	**Prevalence (%)**	**Standard Error**	**Lower**	**Upper**	**Respondents (N=722)**
Current or past caries	33.8	4.7	24.4	43.1	302
Past Treatment	21.7	4.5	12.7	30.7	192
Untreated dental caries	19.3	2.2	14.9	23.7	161
Urgent dental care needed	2.9	1.1	0.7	5.1	14
General Anesthesia	1.6	0.6	0.5	2.8	15

As with the dental outcomes, there were few differences between the groups on dental care access and utilization measures. However, children enrolled in Medicaid for longer than 12 months had a significantly higher prevalence of ever having seen a dentist than children not matched to the Medicaid eligibility file (Table 14), as was found with the parent-reported Medicaid status.

Table 14: Prevalence of Dental Care Access and Utilization among Children Newly Enrolled in Head Start in Texas by Verified Medicaid Status, September 2013-December 2013, Weighted and Adjusted for Non-Response

	Medicaid 12 Months or Longer (Matched Data)				
			95% Confidence Intervals		
Dental Care	**Prevalence (%)**	**Standard Error**	**Lower**	**Upper**	**Respondents (N=1,185)**
Ever seen a dentist	93.8	1.1	91.5	96.1	1,116
Seen a dentist within past year	82.1	2.1	77.9	86.3	1,011
Have a family dentist	68.5	3.1	62.3	74.7	864
	Medicaid less than 12 Months (Matched Data)				
			95% Confidence Intervals		
Dental Care	**Prevalence (%)**	**Standard Error**	**Lower**	**Upper**	**Respondents (N=324)**
Ever seen a dentist	94.6	2.3	90.0	99.2	313
Seen a dentist within past year	79.6	4.8	70.1	89.2	272
Have a family dentist	44.4	7.7	29.0	59.8	211
	Non-Medicaid (Matched Data)				
			95% Confidence Intervals		
Dental Care	**Prevalence (%)**	**Standard Error**	**Lower**	**Upper**	**Respondents (N=722)**
Ever seen a dentist	86.0	2.4	81.2	90.9	637
Seen a dentist within past year	73.0	4.2	64.7	81.4	555
Have a family dentist	58.6	3.5	51.6	65.6	459

Results Comparison of the First and Second Assessments of Head Start

Data from the first and second dental assessments were compared. The data from the first assessment were not suitable to be matched with Medicaid eligibility files; therefore, the parent's report of Medicaid status was used to compare between the years. As in the third grade comparison, the assessment of past treatment is not comparable across the years so is not included for the first assessment. Additionally, in the first assessment, a suitable population frame could not be established for Head Start; therefore, these data are not weighted. The second assessment is weighted and the prevalence measures and corresponding confidence intervals are estimates for the population of newly enrolled Head Start students.

Most all of the dental assessment measures did not significantly change from the first assessment to the second assessment. There was a significant decrease in the prevalence of children needing urgent dental care from the first to the second assessment among children enrolled in Medicaid.

Table 15. Comparison of the 2008-2009 and the 2012-2013 Prevalence Rates of Selected Dental Health Outcomes among Head Start Students in Texas by Medicaid Status

	2008-2009 Assessment			2013 Assessment		
		95% Confidence Intervals			95% Confidence Intervals	
	Prevalence (%)	Lower	Upper	Prevalence (%)	Lower	Upper
Medicaid (Parent Report)						
Current or past caries	38.4	35.4	41.4	46.0	39.8	52.2
Past Treatment	---	---	---	31.3	25.8	36.7
Untreated dental caries	19.7	17.2	22.1	22.2	18.8	25.6
Urgent dental care needed	3.3	2.2	4.4	1.0	0.2	1.9
General Anesthesia	0.8	0.0	1.6	1.6	0.7	2.5
Non-Medicaid (Parent Report)						
Current or past caries	38.0	33.1	42.8	32.7	21.3	44.0
Past Treatment	---	---	---	17.4	10.8	24.0
Untreated dental caries	32.0	27.4	36.7	21.7	10.6	32.8
Urgent dental care needed	6.2	3.8	8.6	5.1	0.5	9.6
General Anesthesia	0.7	0.2	1.2	0.6	0.0	1.2

Conclusions

The results of the second dental assessment showed that in both the third grade and Head Start populations, Medicaid enrolled children were significantly different from non-Medicaid enrolled children on some, but not all, dental assessment points.

In Head Start, the Medicaid and non-Medicaid groups were not significantly different from each other except in terms of whether or not they had seen a dentist. Children enrolled in Medicaid for more than a year had the highest prevalence of ever seeing a dentist. Overall, the prevalence of all the dental outcome measures gathered through the LOE was relatively small in the Head Start population. There was little change in these rates from the first to the current assessment. The exception to this finding was with the percentage of Head Start students needing urgent dental care. Medicaid recipients in the 2013 assessment had a lower prevalence of needing urgent care than those participating in the 2008 assessment. This lower prevalence was seen in both the parent report of Medicaid status and the matched Medicaid data.

The third grade assessment revealed clearer differences between the Medicaid and non-Medicaid groups and between the first and second assessment. Children enrolled in Medicaid had a higher prevalence of experience with caries than the non-Medicaid group. However, for most of the dental outcome measures that assessed access, students enrolled in Medicaid fared better than non-Medicaid enrolled students. Over half of the children enrolled in Medicaid for more than 12 months had sealants. This prevalence is significantly higher than children who had been enrolled in Medicaid for shorter than 12 months and children who were not enrolled in Medicaid. In comparison to the previous dental assessment, the state as a whole showed a significant increase in the prevalence of sealants.

Complementing the sealant results was a significant decrease in untreated dental caries for both groups (Medicaid and non-Medicaid) from the first to second assessment. Using our conservative criterion for judging significant differences, there were no significant differences in the prevalence of untreated dental caries between the children enrolled in Medicaid for more than 12 months and non-Medicaid children in the current assessment. However, for the parent-reported status, Medicaid enrolled children had a significantly lower prevalence of untreated caries. For the dental utilization measures, children enrolled in Medicaid for more than 12 months had a significantly higher prevalence than non-Medicaid children of having seen a dentist in the past year. This higher reported utilization suggests that these children have a higher chance of having tooth decay (if any) diagnosed and treated by a dentist.

The overall findings of this assessment show that the oral health outcomes of children enrolled in Medicaid as compared to non-Medicaid children showed some significant differences, but in only one of the domains were Medicaid children worse than non-Medicaid children. In several domains, Medicaid enrolled children are doing better than their non-Medicaid enrolled peers and have significantly higher rates of access and utilization of dental services. Between the first and second dental assessments, the third grade population saw significant gains in many oral health outcomes and dental utilization measures. The prevalence of the oral health outcome measures was consistent in the Head Start population across the assessments, but the prevalence of these outcomes is low in this population.

Appendix A: Parent Permission Form

TEXAS BASIC SCREENING SURVEY (3rd Grade)
PARENTAL PERMISSION FORM & QUESTIONNAIRE

Dear Parent/Guardian:
Site Name: _____
Please complete this form and return it to your child's teacher tomorrow.

On _____, a regional dental team, to include a dentist and dental hygienist from the Texas Department of State Health Services, will be at your child's school to conduct a limited oral evaluation and may provide dental sealants and/or fluoride varnish as part of the Texas Basic Screening Survey. **If your child is a candidate and qualify for dental sealants and/or fluoride varnish application, these dental services will be FREE to children who have a completed parental permission form**. After the dental evaluation, a written report will be provided for your child to take home, stating his/her dental condition.

Dental sealants are thin, plastic coatings that may be applied to the chewing surfaces of teeth. They fill in the deep pits and grooves where food and germs collect, and can prevent tooth decay (cavities) in the teeth that are sealed. No shots or anesthesia is necessary for the application. Fluoride varnish is a protective coating that is placed on the teeth to help prevent new cavities and to help stop very small cavities that have already started. Together, fluoride and dental sealants could possibly prevent most tooth decay.

Please read and complete the information below and sign the statement for informed permission if you wish your child to participate in the oral evaluation, sealants, and/or fluoride varnish program. **The limited oral evaluation does not take the place of regular dental checkups and you should continue to take your child to their dentist for on-going dental checkups and treatment.**

Child's Name (please print) _____ Age_____ Date of Birth_____
Address_____
Telephone number with area code ( ) _____
Parent/Guardian Name (please print) _____

Please answer the next questions to help us learn more about your child's health history. Your answers will remain private and will not be shared.

Please circle your answers to each of the questions below:
Sex of your child: **Male** **Female** Child's Race/Ethnicity: **White** **Black** **Hispanic** **Other**
Is your child enrolled in Medicaid? **Yes** **No** Medicaid Card Number #: _____Is your child eligible for the free/reduced lunch program? **Yes** **No**

1. Is your child under the care of a doctor? **Yes** **No**
   If yes, for what reason_____
2. Is your child currently taking any medicine? **Yes** **No**
   If yes, what is the name/type of medicine? _____
3. Does your child have any allergies, such as to red dye or latex? **Yes** **No**
   If yes, please list _____
4. Does your child have any serious illnesses? **Yes** **No**
   If yes, please explain _____
5. Has your child been seen by a dentist before? _____ **Yes** **No**
6. If child has been seen by a dentist before, was last visit within the past 12 months? **Yes** **No**

7. Do you have a family dentist? Dentist's name_____ **Yes** **No**
8. Please check which of the following conditions your child has currently or has had in the past:

□ **1.** asthma	**4.** Hepatitis	**7.** epilepsy/seizures	**10.** respiratory problems	**12.** HIV+/AIDS
□ **2.** heart disease	**5.** Diabetes	**8.** Fainting	**11.** high blood pressure	**13.** tuberculosis
□ **3.** heart murmur	**6.** cough	**9.** bleeding disorders		

9. Does your child have any of the following: **Yes** **No**

Autism or Autism Spectrum Disorder, Down Syndrome, Mental retardation/ developmental delay, depression/anxiety/emotional problems, anemia/sickle cell disease, Cystic Fibrosis, Cerebral Palsy, Muscular Dystrophy, Attention Deficit Disorder (ADD)

10. Does your child get any of the following: **Yes** **No**

Physical therapy; occupational therapy; speech therapy; treatment or counseling for any developmental, emotional, or behavior problem

INFORMED PERMISSION STATEMENT

I, [print name] _____ hereby give permission for my child [print name] _____ to receive a free limited oral evaluation and may receive dental sealants and/or fluoride varnish as part of the Texas Basic Screening Survey**.** I understand that my permission is required before my child can participate. I also state that I have received the DSHS Notice of Privacy Practices.

If you do not want your child to receive dental sealants, then please check here _____

If you do not want your child to receive fluoride varnish application, then please check here _____

Parent/Guardian Signature _____Date _____

Notice about Your Right to Privacy

Except in some cases, you have the right to ask for and know the information the State of Texas has about you. You can ask for it at any time. You can get it and make sure it is right. You have the right to ask the state agency to correct anything that is wrong. (Reference: Government Code, Section 552.021, 552.023, 559.003 and 559.004). If you have any questions, please email the IRB at InstitutionalReviewBoard@dshs.state.tx.us or call at (512) 776-2202 and toll-free 1-888-963-7111, extension 2202.

TEXAS Department of State Health Services

2013- 2014 HEAD START TEXAS BASIC SCREENING SURVEY

PARENTAL PERMISSION FORM & QUESTIONNAIRE

Dear Parent/Guardian: Center's Name_____
Name:_____

Please complete this form and return it to your child's teacher tomorrow.

On _____, a regional dental team, to include a dentist and dental hygienist from the Texas Department of State Health Services, will be at your child's Head Start center to conduct a limited oral evaluation and may also provide a fluoride varnish application as part of the Texas Basic Screening Survey. Fluoride varnish is a protective coating that is placed on the teeth to help prevent new cavities and to help stop very small cavities that have already started. **These dental services will be FREE to children who have a completed parental permission form**. After the limited oral evaluation, a written report will be provided for your child to take home, stating his/her dental condition. The data collected will be used to evaluate the preschool population and could also be used for future research.

Please read and complete the information below and sign the statement for informed permission if you wish your child to participate in the oral evaluation, and/or fluoride varnish program. **The limited oral evaluation does not take the place of regular dental checkups and you should continue to take your child to their dentist for on-going dental checkups and treatment.**

Child's Name (please print) _____ Age_____ Date of Child's Birth: (MM/DD/YYYY)_____
Address_____
Telephone number with area code ( ) _____
Parent/Guardian Name (please print) _____

Please answer the next questions to help us learn more about your child's health history. Your answers will remain private and will not be shared.
Please circle your answers to each of the questions below:
Sex of your child: **Male F emale** Child's Race: **White B lack Other** Child's Ethnicity: **Hispanic Non-Hispanic**
Is your child enrolled in Medicaid? **Yes No** Medicaid Card #_____

1. Is your child under the care of a doctor? ---------- **Yes No**
   If yes, for what reason_____
2. Is your child currently taking any medicine? **Yes No**
   If yes, what is the name/type of medicine? _____
3. Does your child have any allergies, such as to red dye or latex? ---------- **Yes No**
   If yes, please list _____
4. Does your child have any serious illnesses? ----------**Yes No**
   If yes, please explain _____
5. Has your child been seen by a dentist before? ---------- **Yes No**
6. If child has been seen by a dentist before, was last visit within the past 12 months? **Yes No**
7. Do you have a family dentist? Dentist's name_____ **Yes No**
8. Please check which of the following conditions your child has currently or has had in the past:

☐ **1.** asthma	☐ **4.** hepatitis	☐ **7.** epilepsy/seizures	☐ **10.** respiratory problems	☐ **12.** HIV+/AIDS
☐ **2.** heart disease	☐ **5.** diabetes	☐ **8.** fainting	☐ **11.** high blood pressure	☐ **13.** tuberculosis
☐ **3.** heart murmur	☐ **6.** cough	☐ **9.** bleeding disorders		

9. Does your child have <u>any</u> of the following: **Yes No**
Autism or Autism Spectrum Disorder, Down Syndrome, Mental retardation/ developmental delay, depression/anxiety/emotional problems, anemia/sickle cell disease, Cystic Fibrosis, Cerebral Palsy, Muscular Dystrophy, Attention Deficit Disorder (ADD)
10. Does your child get <u>any</u> of the following: **Yes No**
physical therapy; occupational therapy; speech therapy; treatment or counseling for any developmental, emotional, or behavior problem

INFORMED PERMISSION STATEMENT

I, [print name] _____ hereby give permission for my child [print name] _____ to receive a free limited oral evaluation and may receive fluoride varnish as part of the Texas Basic Screening Survey**.** I understand that my permission is required before my child can participate. I also state that I have received the DSHS Notice of Privacy Practices.

Please check here:

□ I do not want my child to have a limited oral evaluation

□ I do not want my child to receive fluoride varnish

Parent/Guardian Signature_____ Date _____

Notice about Your Right to Privacy

Except in some cases, you have the right to ask for and know the information the State of Texas has about you. You can ask for it at any time. You can get it and make sure it is right. You have the right to ask the state agency to correct anything that is wrong. (Reference: Government Code, Section 552.021, 552.023, 559.003 and 559.004). If you have any questions, please email the IRB at InstitutionalReviewBoard@dshs.state.tx.us or call at (512) 776-2202 and toll-free 1-888-963-7111, extension 2202.

Appendix B: Calibration Results

DATE: September 17, 2012

TO: Dr. Linda Altenhoff, Texas Department of State Health Services

FROM: Kathy Phipps, Data & Surveillance Coordinator, Association of State and Territorial Dental Directors

RE: Calibration Training Results for Texas Department of State Health Services 3rd Grade Basic Screening Survey

Recognizing the need for community level oral health status and dental care access data, the Association of State and Territorial Dental Directors (ASTDD) developed the *Basic Screening Survey* (BSS) in collaboration with the Ohio Department of Health and the Division of Oral Health, Centers for Disease Control and Prevention. The primary purpose of the BSS is to provide a framework to state health divisions for obtaining state level oral health data that is inexpensive and easy to implement; yet always consistent. By collecting data in a consistent manner, states have the ability to compare their data with data collected by other agencies and to monitor state level trends over time.

To assure consistency, ASTDD recommends that states train dental examiners on how to use the BSS and the criteria for determining the presence of treated and untreated decay along with the presence of dental sealants and urgency of need for restorative care. For data to qualify for the National Oral Health Surveillance System (www.cdc.gov/nohss), the training can be limited to having examiners watch a 15 minute video developed by ASTDD. Having dental examiners watch a training video has been shown to be an effective way to standardize examiners for a Basic Screening Survey.1 Although not required, states can provide a more comprehensive training including a didactic session with clinical photos plus a clinical session that includes all examiners screening the same set of children. Including a clinical session allows for the calibration of examiners and the ability to generate measures of inter-examiner reliability.

On August 7, 2012 I conducted a didactic and clinical training and standardization for the six dental examiners who will be collecting data for the Texas 3rd Grade Basic Screening Survey. As the Data and Surveillance Coordinator for ASTDD, I developed the current BSS examiner training video and have conducted examiner trainings for numerous state and federal health agencies. The Texas BSS examiner training included the following elements: (1) a two hour didactic course with clinical slides plus a (2) two hour clinical session to review criteria and complete an examiner calibration exercise. As part of the clinical calibration session, 12 volunteer subjects were independently examined to permit the calculation of inter-examiner reliability.

Inter-examiner reliability for the presence of untreated decay was estimated using a pairwise, un-weighted kappa statistic. A kappa statistic is a measure of inter-examiner agreement for categorical items. It is a more robust measure than a simple percent agreement calculation because kappa takes into account agreement occurring by chance. A kappa score of 0.0 is no agreement while a kappa of 1.0 is perfect agreement. Although there are no definitive criteria for what are deemed to be acceptable levels of examiner reliability, two recent dental caries clinical trials have considered an un-weighted kappa score of 0.60 to be acceptable.2

Table 1 presents the kappa statistics for each of the six examiners against me as the “gold standard”. Four of the examiners had acceptable agreement with one examiner having perfect agreement. Because two examiners had less than acceptable agreement after the first session a secondary training plan was developed. The examiners were asked to review the BSS criteria and participate in a second calibration session with a “new” gold standard. For the second calibration session the examiner that had perfect

agreement with me during the first calibration session (examiner MW) was the new gold standard. Both the new gold standard and the two examiners independently screened 10 children. The kappa scores for the second calibration session are presented in Table 1; both examiners achieved perfect agreement with the new gold standard.

The six examiners that will be collecting data for the Texas 3rd Grade Basic Screening Survey have been adequately trained, have acceptable inter-examiner reliability and are ready to collect accurate and reliable oral health status data. Please contact me if you have any questions.

Table 1: Kappa statistic for presence of untreated decay, each examiner compared to the gold standard **Examiner**	**Initial Training Kappa Statistic Gold Standard vs. Examiner**	**Secondary Training Kappa Statistic New Gold Standard vs. Examiner**
MW	1.0	NA
RM	0.8	NA
LA	0.8	NA
RH	0.6	NA
LB	0.4	1.0
VN	0.2	1.0

1 Beltrán ED, Malvitz DM, Eklund SA. Validity of two methods for assessing oral health status of populations. J Public Health Dent. 1997;57:206-14.
2 Banting DW, Amaechi BT, Bader JD, et al. Examiner training and reliability in two randomized clinical trials of adult dental caries. J Public Health Dent 2011;71:335-44.

Appendix C: Formulae and Technical Notes

Probability Proportional to Size (PPS) and Basic Probability Weights:

Probability proportional to size was the sampling strategy used for both the 3rd grade and the Head Start samples. However, because the structure and data for each group differed, a slightly different sampling technique was employed with Head Start. Head Start sites (schools) do not report enrollment, only grantees (who may have multiple sites) report enrollment. Therefore, we first sampled grantees with PPS. The grantee then reported site specific enrollment to us once they agreed to participate. After receiving this information, the site(s) was (were) selected using PPS for the grantee.

Additionally, for Head Start, only new enrollees were eligible to participate. When the equation below refers to "number of individuals," it means "the number of new enrollees" for the Head Start sample.

$$\underline{\rho(\text{grantee})} = \frac{Number\ of\ individuals\ in\ the\ grantee * Number\ of\ grantees\ sampled}{Total\ number\ of\ individuals\ in\ the\ stratum}$$

$$\underline{\rho(\text{school})} = \frac{Number\ of\ individuals\ in\ the\ school * Number\ of\ schools\ sampled}{Total\ number\ of\ individuals\ in\ the\ stratum}$$

$$\underline{\rho(\text{individual})} = \frac{Number\ of\ individuals\ sampled\ in\ school}{Total\ Number\ of\ individuals\ in\ the\ school}$$

$$\underline{\text{Basic unadjusted weights (3rd grade)}} = \frac{1}{\rho(school) * \rho(individual)}$$

$$\underline{\text{Basic unadjusted weights (Head Start)}} = \frac{1}{\rho(grantee) * \rho(school) * \rho(individual)}$$

$$\underline{\text{Basic adjusted weights}} = \frac{Basic\ unadjusted\ weight}{response\ rate}$$

ρ(grantee) = the probability that a Head Start grantee will be sampled

ρ(school) = the probability that a school will be sampled

ρ(individual)= the probability that an individual will be sampled

Response / Refusal Weights:

$$\underline{\text{Response rate}} = \frac{(Completed + Absent)}{(Completed + Absent + Refused + No\ Response + Unknowns)}$$

$$\underline{\text{Refusal rate}} = \frac{Refusals}{(Completed + Absent + Refused + NoResponse + Unknowns)}$$

Completed = Sum of cases where the parent gave permission and the child was assessed on the LOE.

Absent = Sum of cases where the parent gave permission, but the child was absent the day the LOE was completed. These were considered partially complete because all information from the permission form was completed. In the Head Start assessment, children who were uncooperative and could not complete the LOE were also included in this category for calculation purposes.

Refusals = Sum of cases where the parent returned a permission slip and indicated that the child could not participate in the dental assessment.

No Response = Sum of cases where the parents did not return the permission slip.

Unknowns = Sum of all other situations that led to a child not being assessed.

Head Start New Enrollment Estimation

The total enrollment for all Head Start grantees in Texas is known. However, each of these grantees has several sites where children attend the preschool. The enrollment in these sites is not known, except by the grantee. Additionally, Head Start grantees do not track how many new students are enrolled; only sites have that information and there is not a complete list of Head Start sites in the state. In order to estimate the population of newly enrolled Head Start students, the proportion of newly enrolled students to total enrollment was calculated from the sites that were visited. Then, the enrollment at the level of the grantee, the level of the stratum, and the level of the state was adjusted based on this proportion. The proportion was calculated at the level at which it was being applied.

For example, at the level of the stratum:

Estimated new enrollment =

$$Total\ enrollment\ in\ stratum * \frac{sum\ of\ all\ new\ enrollees\ in\ sites\ visited\ in\ the\ stratum}{sum\ of\ total\ enrollment\ for\ sites\ visited\ in\ stratum}$$

Multiple Imputations:

It has been well established in the statistics literature that missing data can systematically bias analyses even when those data are missing at random [8]. It is strongly suggested that missing data values be imputed or estimated when the missing data meet certain conditions. When they do not meet these conditions, it is suggested that the missing data be analyzed directly as a part of the study. A number of missing data imputation techniques exist and have been extensively researched and tested. The most widely-used technique for complex data is the multiple imputation technique [3, 5]. This technique is an extension of regression and uses a maximum likelihood structure or a Markov Chain to impute values through a multiple iteration procedure that takes into consideration the variance and standard error of each of the included variables. The following describes how this technique was utilized with these data and implemented in SAS, specifically.

SAS procedure, PROC MI, was used to create multiple imputed data sets for incomplete *p*-dimensional multivariate data. Based on the missing data patterns, the method of choice for imputation was the MCMC or Markov chain Monte Carlo method.

PROC MI <*options*>;
by *variables*;

This procedure was followed by a subsequent imputation using logistic regression for imputation of remaining missing data with categorical variables. PROC SURVEYLOGISTIC was used to predict a binary outcome for Medicaid. A domain statement was included to perform a logistic regression for each imputed data set. Ten datasets were independently imputed using these procedures. This number was chosen because the amount of missing data was relatively small and this number of data sets has been shown to be effective in accurately imputing data with small to moderate amounts of missing data.

PROC SURVEYLOGISTIC <*options*>;
cluster <*variable*>;

strata <*variable*>;
weight <*variable*>;
class <*variables*>;
model <*variables*>;
domain <*variable*>;

The 10 complete data sets were then analyzed using PROC MIANALYZE to generate valid statistical inferences about these parameters by combining results from 10 complete data sets.

PROC MIANALYZE <*options*>;
class <v*ariable*s>;
modeleffects <*variable*>;

Lastly, the final data set was created for standard analysis using the lowest absolute difference between each individual imputed data set and the total imputed data set.

Imputation Results for 3rd Grade:

Analysis of the missing data patterns showed that there were systematic differences in missing Medicaid data for white and non-white. Therefore, the imputation models were run separately for each. There were no other systematic patterns of missing data beyond this, and according to the procedures outline in Schwartz et al. ([4, 5]), the data missing within each group were missing at random.

The model that was used to impute Medicaid for whites explained 28% of the variance (42% of rescaled variance). The predictors included were free and reduced lunch, mental or physical disability, past treatment for caries, having untreated caries, and the presence of permanent sealants. Outcome measures were included in the imputation model following the work by Moons and others [7] showing that including outcome measures reduces bias in the missing data models.

The final model for non-whites explained 22% of the variance (30% of rescaled variance). This model included free and reduced lunch, the language in which the parent filled out the permission form, mental and physical disabilities, whether the child had seen a dentist, evidence of past treatment for caries, evidence of permanent sealants, and the child's treatment urgency.

The 10 final models that were imputed all had prevalence estimates with small absolute differences from the prevalence estimates in the average model. The models that were chosen were very close to the average. The model for whites only differed from the average model .25 percentage points and the nonwhite model differed from the average model by .06 percentage points.

Of the 545 records with missing parent reported Medicaid status, 243 were imputed to be included in the parent-reported Medicaid category in the data set used in this report. The matching to the Medicaid enrollment data verified that 220 of the original 545 records with missing parent-reported Medicaid status were enrolled in Medicaid, showing the validity of our imputation model.

Imputation Results for Head Start:

The Head Start sample has substantially more missing data on the Medicaid variable (11.2 percent of the un-weighted sample) than the third grade sample. An attempt was made to build a model that would impute the parent-reported Medicaid variable as was done with the third grade sample. None of the models explained more than 10 percent of the rescaled variance. After imputation, variance in the

prevalence estimates were analyzed and found to be large across the imputations. Therefore, for the Head Start sample, "missing Medicaid" was included in the analysis as a group and analyzed, as is common when an adequate imputation model cannot be developed [8].

95 percent Confidence Interval

Each confidence interval presented here is a measure of the precision of its associated prevalence. Since the prevalence was calculated from a sample of the population, it is an *estimate* of the true value of the population. A larger sample size will result in a more precise prevalence estimate, and thus, a narrower confidence interval. If confidence intervals for two estimates do *not* overlap, then there is a statistically significant difference between the prevalence estimates. However, if confidence intervals *do* overlap, then there *may or may not* be a statistically significant difference between the prevalence estimates.

For the purposes of this report, we took the most conservative approach and only called a difference between prevalence estimates significant if the confidence intervals did not overlap.

Appendix D: Criteria for Dental Therapy under General Anesthesia

The following criteria guidelines are for IV or general anesthesia indications for children's dental therapy:

Total points needed to justify treatment under general anesthesia=22.

Age of patient at time of examination	Points
Less than four years of age	8
Four and five years of age	6
Six and seven years of age	4
Eight years of age and older	2

Treatment Requirements (Carious and /or Abscessed Teeth)	Points
1-2 teeth or one sextant	3
3-4 teeth or 2-3 sextants	6
5-8 teeth or 4 sextants	9
9 or more teeth or 5-6 sextants	12

Behavior of Patient**	Points
Definitely negative – unable to complete exam, patient unable to cooperate due to lack of physical or emotional maturity, and/or disability	10
Somewhat negative – defiant; reluctant to accept treatment; disobeys instruction; reaches to grab or deflect operator's hand, refusal to take radiographs	4
Other behaviors, such as moderate levels of fear, nervousness, and cautious acceptance of treatment, should be considered as normal responses and are not indications for treatment under general anesthesia	0
** Requires that narrative fully describing circumstances be present in the patient's chart	

Additional Factors**	Points
Presence of oral/perioral pathology (other than caries), anomaly, or trauma requiring surgical intervention**	15
Failed conscious sedation**	15
Medically compromising of handicapping condition**	15
** Requires that narrative fully describing circumstances be present in the patient's chart	

I understand and agree with the dentist's assessment of my child's behavior.
REQUESTING DENTIST'S SIGNATURE: _____DATE: _____
Children needing IV sedation/general anesthetic who do not meet the 15 point threshold by report.
To proceed with the dental care and general anesthesia, this form, the appropriate narrative, and all supporting documentation, as detailed in Attachment 1, must be included in the patient chart. The patient chart must be available for review by representatives of NHIC and/or HHSC.

REQUESTING DENTIST'S SIGNATURE: _____
DATE: _____License No. _____

Medicaid Dental Policy Regarding Criteria for Dental Therapy Under General Anesthesia–Attachment 1

Purpose: To justify I.V. Sedation or General Anesthesia for Dental Therapy, the following documentation is required in the Child's Dental Record.

Elements: Note those required* and those as appropriate**:

1) The medical evaluation justifying the need for anesthesia

2) Description of relevant behavior and reference scale

3) Other relevant narrative justifying the need for general anesthesia.

4) Client's demographics, including date of birth.

5) Relevant dental and medical history.

6) Dental radiographs, intraoral\perioral photography and/or diagram of dental pathology.

7) Proposed Dental Plan of Care.

8) Consent signed by parent\guardian giving permission for the proposed dental treatment and acknowledging that the reason for the use of IV sedation or general anesthesia for dental care has been explained.

9) Completed Criteria for Dental Therapy under General Anesthesia form.

10) The parent/guardian dated signature on the Criteria for Dental Therapy under General Anesthesia form attesting that they understand and agree with the dentist's assessment of their child's behavior.

11) Dentist's attestation statement and signature, which may be put on the bottom of the Criteria for Dental Therapy under General Anesthesia form or included in the record as a stand-alone form.

"I attest that the client's condition and the proposed treatment plan warrant the use of general anesthesia. Appropriate documentation of medical necessity is contained in the client's record and is available in my office."

Resources/References:

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3. Berglund A. An Introduction to Multiple Imputation of Complex Sample Data Using SAS V9.2. *SAS Global Forum*. Seattle, Washington, 2010.
4. Schwartz T, Chen Q, Duan N. Studying Missing Data Patterns Using a SAS Macro. *SAS Global Forum*. Las Vegas, NV, 2011.
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7. Moons K, et al. Using the Outcome for Imputation of Missing Predictor values was preferred. *J Clin Epi* 59 (2006) 1092-1101.
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